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On an important error in Bouvard's Tables of Saturn. By Mr. Adams.

"Having lately entered upon a comparison of the theory of *Saturn* with the Greenwich observations, I was immediately struck with the magnitude of the tabular errors in heliocentric latitude, and the more so, since the whole perturbation in latitude is so small, that it could not be imagined that these errors arose from any imperfection in the theory. In order to examine the nature of the errors, I treated them by the method of curves, taking the times of observation as abscissæ, and the corresponding tabular errors as ordinates. After eliminating, by a graphical process, the effects of a change in the node and inclination, a well-defined inequality became apparent, the period of which was nearly twice that of *Saturn*. One of the principal terms of the perturbation in latitude (viz. that depending on the mean longitude of *Jupiter* minus twice that of *Saturn*) having nearly the same period, I was next led to examine whether this term had been correctly tabulated by Bouvard. The formula in the introduction appeared to be accurate, but on inspecting the Table XLII. which professes to be constructed by means of this formula, I was surprised to find that there was not the smallest correspondence between the numbers given by the formula and those contained in the table, the latter following the simple progression of sines, while the formula contained two terms. The origin of this mistake is rather curious. Bouvard's formula for the terms in question is

$$9''{\cdot}67 \sin \left\{ \varphi - 2\varphi' - 60^\circ{\cdot}29 \right\} + 28''{\cdot}19 \sin \left\{ 2\varphi - 4\varphi' + 66^\circ{\cdot}12 \right\}$$

but in tabulating the last term he appears to have taken the simple argument $\varphi - 2\varphi'$ instead of $2\varphi - 4\varphi'$, so that the two parts may be united into a single term,

$$25''{\cdot}85 \sin \left\{ \varphi - 2\varphi' + 43^\circ{\cdot}88 \right\}$$

which I find very closely to represent Bouvard's Table XLII.

"After correcting the above error, and making a proper alteration in the inclinations and place of the node, the remaining errors of latitude are in general very small. I subjoin a correct table to be used instead of Bouvard's. The constant added being 36″·0 instead of 26″·0, it will be necessary to subtract 10″·0 from the final result."

Table XLII.

Argument III. de la Longitude.

Argument.	Equation.	Argument.	Equation.	Argument.	Equation.	Argument.	Equation.
0	52″·4	2500	17″·4	5000	68″·1	7500	6″·1
100	54·4	2600	16·2	5100	69·4	7600	4·0
200	56·0	2700	15·5	5200	70·2	7700	2·3
300	57·2	2800	15·2	5300	70·5	7800	1·1
400	58·0	2900	15·2	5400	70·4	7900	0·4
500	58·3	3000	15·7	5500	69·8	8000	0·1
600	58·3	3100	16·6	5600	68·7	8100	0·4
700	57·8	3200	17·9	5700	67·2	8200	1·0
800	56·9	3300	19·6	5800	65·3	8300	2·2
900	55·7	3400	21·7	5900	62·9	8400	3·7
1000	54·1	3500	24·1	6000	60·1	8500	5·7
1100	52·2	3600	26·7	6100	57·1	8600	8·0
1200	50·0	3700	29·7	6200	53·7	8700	10·7
1300	47·5	3800	32·8	6300	50·0	8800	13·7
1400	44·9	3900	36·2	6400	46·2	8900	16·8
1500	42·1	4000	39·6	6500	42·1	9000	20·2
1600	39·2	4100	43·1	6600	38·0	9100	23·7
1700	36·2	4200	46·5	6700	33·9	9200	27·3
1800	33·3	4300	50·0	6800	29·8	9300	31·0
1900	30·4	4400	53·3	6900	25·7	9400	34·5
2000	27·7	4500	56·5	7000	21·8	9500	38·0
2100	25·1	4600	59·4	7100	18·1	9600	41·4
2200	22·8	4700	62·1	7200	14·6	9700	44·6
2300	20·6	4800	64·5	7300	11·4	9800	47·5
2400	18·8	4900	66·5	7400	8·5	9900	50·1
2500	17·4	5000	68·1	7500	6·1	10000	52·4

Constante ajoutée 36″·0.